situated, as regards funds, as Oxford is at the present day, and yet the just claims of the most progressive sciences upon her vast resources are persistently neglected, and she remains in the position of a follower rather than a leader in most of the scientific movements of the day.

The efforts that Prof. Lankester has so successfully made to stimulate his pupils to investigate natural things, have been made in spite of, and not as they should have been with the warm support and sympathy of the collegiate systems that prevail in Oxford.

During the past ten years only four fellowships have been awarded to young zoologists of promise by the Oxford colleges. The recipients of this support have each produced valuable work, which has reflected great credit upon themselves and the enlightened action of the colleges to which they belong. Not one of them has joined the ranks of the idle fellows which abound in the old universities of this country. The experiment cannot, therefore, be said to be a failure. It is as a fact the most conspicuous success of any of the college enterprises of the present day. Why then, it may be asked, have not other colleges followed the example that has been set? The answer to this question is to be found in the fact that, in consequence of the unfortunate competition that exists between colleges to swell the ranks of their undergraduates, the income of the endowments is frittered away in the salaries of the heads, the stewards, the bursars, and the tutors of the pass-men. Whether the time will soon come when a radical alteration will be made in the administration of the college endowments it is difficult to say, but there can be no doubt that the present state of affairs as regards the support of natural science in Oxford is little short of scandalous, and should call for the serious attention of men of influence who have her interests at heart.

Prof. Lankester is to be congratulated on the efforts he has personally made, as shown by the two volumes of "The Linacre Reports," to stimulate research in his own branch of science at Oxford; and it is to be most sincerely hoped that, in a little while, his enterprise will meet with the recognition from the colleges that it deserves.

SYDNEY J. HICKSON.

DEEP SOUNDING IN THE PACIFIC.

A DEEPER spot in the ocean than any yet known has been recently found by H.M. surveying ship *Penguin*. Unfortunately the observation was not complete, as a fault in the wire caused it to break when 4900 fathoms had run out without bottom having been reached.

Commander Balfour reports that this occurred in lat. 23° 40′ S., long. 175° 10′ W., about 60 miles north of a sounding of 4428 fathoms obtained by Captain Aldrich in 1888. A previous attempt to reach bottom had been foiled by a similar accident to the wire when 4300 fathoms had passed out, and the rising wind and sea prevented any further attempt at the time. As the deepest cast hitherto obtained is one of 4655 fathoms near Japan, it is at any rate certain that the depth at the position named is at least 245 fathoms greater.

It is hoped that before long a more successful attempt to find the actual depth will be made.

September 28. W. J. L. WHARTON.

LOUIS PASTEUR.

ON Saturday afternoon, M. Pasteur died at Garches, near St. Cloud, where he had gone for the summer in order to be near Paris, and at the same time to be near the large establishment for the preparation of antitoxic serum.

In 1868, Pasteur suffered from an attack of paralysis, the result apparently of a cerebral hæmorrhage; but although traces of this paralysis remained, he enjoyed fairly good health until 1887, when he developed symptoms of heart and kidney disease, probably a recrudescence of the diseases associated with his earlier paralysis. Four years ago he suffered from influenza, which appears to have left further weakness of the heart. Last winter he was unable to do any work, and in fact was confined to bed for several months; but when summer came, he was able to go to his country house at Villeneuve l'Etang, near St. Cloud, where he remained in comparatively good health, though easily fatigued, until about three weeks ago, when he seems to have felt that the end was approaching. It is stated that "about three weeks ago he kissed his grandchildren fondly, and pressed each for some time to his breast, sobbing as he did so. On being asked what was the matter, he said 'The matter is that I must so soon leave them.'" He appeared to be no worse at this time, but about a week later symptoms of uræmia began to develop, he became comatose, and on Wednesday last the uræmic poisoning became more marked, and by Friday it was evident that there could be only one termination to the illness.

In 1891 (NATURE, March 26) we gave a sketch of his life from the pen of Sir James Paget, some features of which may now be repeated. "Louis Pasteur was born on December 27, 1822, at Dôle, in the Jura, where his father, an old soldier who had been decorated on the field of battle, worked hard as a tanner." Father and mother alike seem to have been earnest, thoughtful people, whose one ambition seems to have been to "make a man" of their son.

"In 1825 they removed to Arbois, and as soon as he was old enough to be admitted as a day boy, Pasteur began his studies in the Communal College, and there, after the first year or two, he worked hard and gained distinction." He then, in turn, studied for a year at the college of Besançon and at the École Normale. He was only fourteen when he first applied for admission, but it was not until he had studied for a year that he went in for the examination; and in 1843 it is recorded that he was fourth on the list of successful competitors. At a very early period he devoted special attention to chemistry under Darlay at Besançon, and then under Dumas at the Sorbonne, and Balard at the École Normale. Here, too, in the École Normale, he commenced that study of molecular physics, especially in relation to the formation of crystals, which led up to his now classical investigation on the isomeric crystals of the tartrates and paratartrates of soda and ammonia. In 1847 he took his degree of Doctor of Science, after which he was appointed Assistant and then Professor of Chemical Physics in the University of Strassburg. In 1854 he was appointed Dean of the Faculty of Sciences at Lille, where he spent three years in organising the new school, and commenced those experiments on fermentation which seemed to follow naturally on his researches on the tartaric acids. He found that certain processes of fermentation were set up by distinct micro-organisms, under the action of which organic salts and even inorganic substances were broken down, and others were formed in their place. Three years later he was appointed Director of Studies in the École Normale in Paris, which office he retained until 1867. During this same period he was Professor, first of Geology, then of Physics, and latterly of Chemistry in the École des Beaux Arts. He also held the position of Professor of Chemistry at the Sorbonne.

As early as 1856, before his recall to Paris, the Royal Society of London awarded to him the Rumford Medal for his researches on the polarisation of light. In 1869 he was made a foreign member of the Royal Society, and in 1874 the Copley Medal was given to him. It is interesting to note in connection with his recent action as regards the Order offered to him by the Emperor William, that, during the bitterness caused by

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the war, M. Pasteur sent back the Diploma of Doctor given to him by the University of Bonn in 1868, and subsequently received a message from the students calling him an impostor and a quack. In 1881 Pasteur was elected a member of the French Academy, succeeding to the seat of M. Littré. About the same time he was made an honorary Doctor of Science of the University of Oxford. In 1887 he was appointed perpetual secretary of the Academy of Sciences, but in 1889, owing to the failure of his health, he was compelled to hand over the duties of this position to M. Bertholet.

At the conclusion of his researches on crystals and wine fermentation, Pasteur commenced an inquiry into the diseases of the silkworm, and in no investigation that he undertook were his method and thoroughness more fully exemplified than in this. When he commenced his inquiry he had never even seen a silkworm, but for four years he spent several months of each year in tracing the germs of the "pebrine" disease through the various stages of development of the worm, egg, larva, chrysalis, and moth. He found what he described as "corpuscles," which he indicated were the contagious elements of the disease. These were taken up from the mulberry-leaves on which they had been previously deposited by diseased moths; some of the worms died, but others went on to the chrysalis and even to the moth stage, still affected by these "corpuscles," and the eggs laid by these moths were also found to contain them. He was convinced that the only way was to breed from moths not affected by the disease, and "to this end he invented the plan which has been universally adopted, and has restored a source of wealth to the silk districts: each female moth, when ready to lay eggs, is placed on a separate piece of linen, on which it may lay them all; after it has laid them and has died, it is dried, and then pounded in water, and, the water is then examined microscopically. If "corpuscles" are found in it, the whole of the eggs of this moth, and the linen on which they are laid, are burnt; if no corpuscles are found, the eggs are kept, to be, in due time, hatched, and yield healthy silkworms."

Pasteur's experiments on fermentation began to have a more direct bearing on disease when Sir Joseph Lister, applying the principles to the changes that occur in wounds, was able by his antiseptic practice to exclude putrefactive and septic germs from wounds, and so to prevent those terrible sequelæ which were the terror of surgeons of the past generation.

Then came Pasteur's great work in bacteriology, his attenuation of the anthrax bacillus and of other pathogenic organisms by which he procured a vaccinating virus, capable of producing a mild form of the disease: as a result of this attack vaccinated animals were protected against the attacks of the non-attenuated organism. This was first proved in connection with fowl-cholera, then in connection with swine erysipelas; but the most important application at that time was in connection with anthrax. His work on hydrophobia is still fresh in the minds of all. Pasteur's work does not end with his death. He had collected in the Institut Pasteur, which was raised as a memorial to his life's work, a band of able and well-trained investigators, who are imbued with the spirit that animated his mind and soul—men who, under his advice and encouragement, are working out the details of the great works that he initiated, who are endowed with some of his great mental power, and who have been fully trained under his eye in the methods of direct experiment and accurate observation, men who have been taught by him "n'avancez rien qui ne puisse être prouvé d'une façon simple et décisive," a rule always practised by himself.

France may well offer a public funeral. Louis Pasteur was one of her noblest sons—an honoured one during his life, and deeply lamented now that he is dead.

In Pasteur not only has France lost the greatest Frenchman, but the world has lost one of its greatest benefactors, not only of this age but of all time. Letters and telegrams of condolence have been sent by men of light and leading in many nations, and they indicate the sorrow felt unto the ends of the earth. No greater testimony than this could be given of the esteem in which the memory of the great investigator is held. The blessings which the human race owes to Pasteur have been recognised for some time, and now that the mind which gave them birth is at rest, one great outburst of grief arises. The expression of sorrow in France is full and sincere. At the funeral, which is arranged to take place next Saturday, the President of the Republic will be present, and other representatives of the French Government, together with a multitude of fellow-workers and friends who revere Pasteur's memory. The funeral procession will first proceed to Notre Dame, where a solemn requiem will be chanted in presence of the Archbishop of Paris. The body will afterwards be placed in one of the vaults of the cathedral until the celebration of the Centenary of the Institute of France, in three weeks' time, when it will be removed to its final resting-place. It has been arranged that the body of the great investigator shall be finally interred at the Institute which bears his name, and which will form a fitting monument to him. The representatives of science who will be assembled in Paris for the Centenary will accompany the transfer of the mortal remains of their foremost fellow-worker; so that while they unite to celebrate the foundation of the Institute of France, they will join together in sorrow for the deep loss which science has sustained.

NOTES.

The eleventh International Geodetic Conference was opened at Berlin on Tuesday. Representatives were present from Austria, Belgium, France, Italy, Japan, Norway, Servia, Spain, Sweden, Switzerland, and the United States. The proceedings were opened by Dr. Bosse, the Prussian Minister of Public Education.

A new meteorological observatory is reported to have been opened on the Brocken, in the Harz Mountains, on Tuesday. The observations obtained there will be useful for discussion in connection with those made at the observatory on Ben Nevis.

Sir David Salomons has arranged for an exhibition of horseless carriages on Tuesday, October 15, at the Tunbridge Wells Agricultural Show Ground, which has been lent to him for the occasion. The carriages will enter the ring at three o'clock p.m. The entrance money received will be used for prizes to be awarded at the show of the Tunbridge Wells and South Eastern Counties Agricultural Society next year, for the best horseless carriages intended to be used for agricultural, trade, and private purposes. Invitation tickets for the exhibition may be secured in order of application by Fellows and Members of the following Institutions sending an addressed envelope to one of the Secretaries—the Institution of Civil Engineers, the Institute of Electrical Engineers, the Institute of Mechanical Engineers, the Royal College of Physicians, and the Royal College of Surgeons.

The Medical Schools attached to London and provincial hospitals commenced a new session on Tuesday with the customary introductory addresses. Prof. J. R. Bradford, at University College, discussed the positions occupied by biology, anatomy, and physiology in the medical curriculum. Dr. A. P. Laurie addressed the students at St. Mary's Hospital on the medical profession and unhealthy trades. At the London Hospital, Dr. J. Hughlings-Jackson was presented with his portrait and a piece of plate, in recognition of his great services to the London Hospital and Medical College, of his distinguished position in the profession, and of the advance he has effected in medical science by his laborious investigations and profound

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